PATENT ABSTRACTS OF JAPAN

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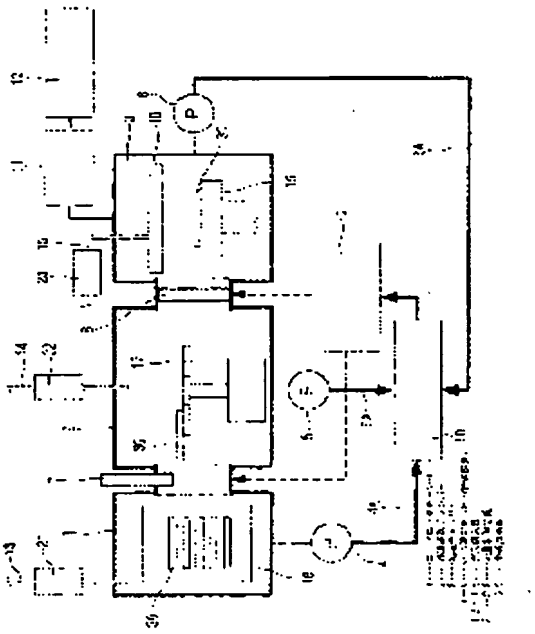
(54) SEMICONDUCTOR MANUFACTURING APPARATUS AND METHOD OF CARRYING SEMICONDUCTOR SUBSTRATE THEREIN

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method of carrying a semiconductor substrate in a semiconductor manufacturing apparatus, which can restrain (reduce) sticking of foreign matters to the semiconductor substrate from the atmosphere of a treatment chamber, which performs a treatment such as film formation or etching to the semiconductor substrate during carriage of the semiconductor substrate into the semiconductor manufacturing apparatus; and to provide a semiconductor manufacturing apparatus.



SOLUTION: When a semiconductor substrate 30 is carried in/out between chambers 1, 2 and 3 in the semiconductor manufacturing apparatus, the semiconductor substrate 30 is carried in/out between the chambers 2 and 3 on the condition that the pressure in the treatment chamber 3 is lower than the pressure in the common carrying chamber 2. When the semiconductor substrate 30 is carried into the semiconductor manufacturing apparatus or the semiconductor substrate 30 is treated in the treatment chamber 3, sticking of the foreign matters can be reduced, and a processing malfunction or sudden increase of the foreign matters can be restrained. Processing stability is improved, and the high-quality semiconductor substrate 30 can be

treated/manufactured.

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CLAIMS

[Claim(s)]
[Claim 1]
1 which processes a semi-conductor substrate thru/or two or more processing chambers, and the common conveyance chamber which makes possible the taking-out close of a semi-conductor substrate at these processing chambers, It has a load lock chamber for connecting with this common conveyance chamber and carrying out taking-out close [of the semi-conductor substrate] between the exteriors, and corresponds to these chambers., respectively Internal pressure assessment equipment, Within the semiconductor fabrication machines and equipment which installed the gas installation equipment which can introduce into the interior of a chamber the gas by which the flow rate was controlled The semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment characterized by performing the taking-out close of a semi-conductor substrate between the chambers concerned in the approach of carrying out taking-out close [of the semi-conductor substrate] between each chamber when the pressure of a processing chamber becomes low rather than the pressure of a common conveyance chamber.
[Claim 2]
The semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment characterized by performing the taking-out close of a semi-conductor substrate between the chambers concerned with the gas installation equipment which is the semi-conductor substrate conveyance approach within semiconductor fabrication machines and equipment according to claim 1, and was installed in the chamber when the pressure of a processing chamber becomes low from the pressure of a sink and a common conveyance chamber about gas at the chamber of one of a common conveyance chamber and the processing chambers, or both.
[Claim 3]
The semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment characterized by there being differential pressure of the processing chamber and common conveyance chamber which are the semi-conductor substrate conveyance approach within semiconductor fabrication machines and equipment according to claim 1 or 2, and carry out taking-out close [of the semi-conductor substrate] by 4Pa or less.
[Claim 4]
The semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment which are the semi-conductor substrate conveyance approaches within semiconductor fabrication machines and equipment according to claim 2, and are characterized by there being gas passed from gas installation equipment with two or more kinds of mixed gas containing nitrogen, the simple substance of inert gas, nitrogen, or inert gas.
[Claim 5]
Semiconductor fabrication machines and equipment characterized by performing the cycle purge which repeats a sink and after that vacuum suction with the gas installation equipment installed in the processing chamber, and performs desired time amount gas at the period when semiconductor fabrication machines and equipment have not processed to the semi-conductor substrate.
[Claim 6]
Semiconductor fabrication machines and equipment characterized by there being gas which is semiconductor fabrication machines and equipment according to claim 5, and is passed from gas

installation equipment with two or more kinds of mixed gas containing nitrogen, the simple substance of inert gas, nitrogen, or inert gas.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]
Especially this invention relates to reduction of the foreign matter adhering to up to a semi-conductor substrate about the conveyance approach of the semi-conductor substrate within semiconductor fabrication machines and equipment, and semiconductor fabrication machines and equipment.
[0002]
[Description of the Prior Art]
In order to enable improvement in a throughput with one equipment, and membrane formation of various film conventionally as opposed to a semi-conductor substrate as semiconductor fabrication machines and equipment which process membrane formation, dry etching, sputtering, etc., the multi chamber method it enabled it to process continuously is common, without combining two pieces or the processing chamber beyond it for the processing chamber which can perform processing of the same class or a different class, and making a semi-conductor substrate expose to atmospheric air. This kind of equipment is enabling conveyance of a semi-conductor substrate at the processing chamber through the cassette load lock and common conveyance chamber which can convey the cassette which held the semi-conductor substrate (for example, patent reference 1 reference.).
[0003]
With the equipment of such a multi chamber method, in order to diffuse the residual gas from a processing chamber in a common conveyance chamber and to prevent the corrosion in a common conveyance chamber, in case a semi-conductor substrate is conveyed to a processing chamber, the pressure of a processing chamber and a common conveyance chamber is set up so that the pressure of a processing chamber may become low identically or slightly (for example, patent reference 2 reference.).
[0004]
Moreover, in order to perform such setting pressure, he supplies gas to a chamber and is trying to become a desired pressure by controlling the gas supply volume as another approach (for example, patent reference 3 reference.).
[0005]
[Patent reference 1]
JP,3-19252,A (the six - 8th page, drawing 1)
[0006]
[Patent reference 2]
JP,5-98434,A (the two - 4th page, drawing 1 - drawing 2)
[0007]
[Patent reference 3]
JP,7-211761,A (the three - 6th page, drawing 1 - drawing 2)
[0008]
[Problem(s) to be Solved by the Invention]
In the above-mentioned conventional semiconductor fabrication machines and equipment, although management and measures are fully taken about the foreign matter after semi-conductor substrate processing, it is rare to carry out to the foreign matter adhesion at the time of semi-conductor

substrate conveyance within equipment, unless large quantity generating is carried out according to problems, such as a trouble of equipment, and it is a problem in respect of product reliability. Although controlling the pressure in a processing chamber at the time of a process is performed about the condition of a processing chamber, it is common at the time of conveyance not to be carried out. Moreover, at the time of conveyance of a semi-conductor substrate and standby of a semi-conductor manufacturing facility, the inside of a processing chamber was held at the vacua of a constant pressure.

[0009]

There are what is generated during membrane formation or process processing of dry cleaning dirty **, and a thing which adheres from the inside of a processing chamber or a conveyance indoor ambient atmosphere during conveyance in the foreign matter which adheres on a semi-conductor substrate. By process processing, it might be hard coming for foreign matter test equipment to detect the foreign matter which adhered the inside of this, and during conveyance, and it often caused poor processing.

[0010]

Then, this invention aims at offering the semi-conductor substrate conveyance approach and semiconductor fabrication machines and equipment within the semiconductor fabrication machines and equipment which can control the foreign matter adhering to a semi-conductor substrate (reduction) from the ambient atmosphere of a processing chamber of processing membrane formation, etching, etc. to a semi-conductor substrate during conveyance of the semi-conductor substrate within semiconductor fabrication machines and equipment.

[0011]

[Means for Solving the Problem]

In order to attain the object mentioned above, the semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment of this invention according to claim 1 1 which processes a semi-conductor substrate thru/or two or more processing chambers, and the common conveyance chamber which makes possible the taking-out close of a semi-conductor substrate at these processing chambers, It has a load lock chamber for connecting with this common conveyance chamber and carrying out taking-out close [of the semi-conductor substrate] between the exteriors, and corresponds to these chambers., respectively Internal pressure assessment equipment, Within the semiconductor fabrication machines and equipment which installed the gas installation equipment which can introduce into the interior of a chamber the gas by which the flow rate was controlled In the approach of carrying out taking-out close [of the semi-conductor substrate] between each chamber, when the pressure of a processing chamber becomes low rather than the pressure of a common conveyance chamber, performing the taking-out close of a semi-conductor substrate between the chambers concerned is characterized by things.

[0012]

Therefore, according to invention of claim 1, in case it carries out taking-out close [of the semi-conductor substrate] to a processing chamber, by losing the pressure differential of a processing chamber and its common conveyance chamber, the turbulence produced by the pressure differential is controlled and foreign matter generating by winding up etc. can be prevented. And by introducing gas into a chamber, tailing on a semi-conductor substrate and adhesion of a up to [a semi-conductor substrate] can be prevented, and, moreover, reduction and a high grade ambient atmosphere can be realized for moisture or the high impurity concentration by external minute leak. Moreover, since it can dilute by the introduced gas also when residual reactivity gas exists, the foreign matter generation by the reaction among mind can be prevented. Furthermore, the pressure of a processing chamber and a common conveyance chamber is controlled, and when the pressure of a processing chamber becomes low rather than the pressure of a common conveyance chamber, foreign matter generating by conveyance can be controlled by performing the taking-out close of a semi-conductor substrate between the chambers concerned. While being able to abolish poor processing and the increment in a foreign matter generated suddenly, improvement in processing quality is realizable by improving processing repeatability with these.

[0013]

Moreover, in the above-mentioned configuration according to claim 1, with the gas installation

equipment installed in the chamber, the semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment of this invention according to claim 2 is characterized by performing the taking-out close of a semi-conductor substrate between the chambers concerned, when the pressure of a processing chamber becomes low from the pressure of a sink and a common conveyance chamber about gas at the chamber of one of a common conveyance chamber and the processing chambers, or both.

[0014]

Therefore, according to invention of claim 2, tailing on a semi-conductor substrate and adhesion of a up to [a semi-conductor substrate] can be prevented by introducing gas at least to one side of a common conveyance chamber and a processing chamber.

[0015]

And the semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment of this invention according to claim 3 is characterized by there being differential pressure of the processing chamber and common conveyance chamber which carry out taking-out close [of the semi-conductor substrate] by 4Pa or less in the above-mentioned configuration according to claim 1 or 2.

[0016]

Therefore, according to invention of claim 3, there is the prevention effectiveness of foreign matter adhesion more by setting up so that differential pressure may be set to 4Pa or less.

Furthermore, it is characterized by there being the semi-conductor substrate conveyance approach within the semiconductor fabrication machines and equipment of this invention according to claim 4 with two or more kinds of mixed gas with which the gas passed from gas installation equipment contains nitrogen, the simple substance of inert gas, nitrogen, or inert gas in the above-mentioned configuration according to claim 2.

[0017]

The semiconductor fabrication machines and equipment of this invention according to claim 5 are characterized by performing the cycle purge which repeats a sink and after that vacuum suction with the gas installation equipment installed in the processing chamber, and performs desired time amount gas at the period when semiconductor fabrication machines and equipment have not processed to the semi-conductor substrate.

[0018]

Therefore, according to invention of claim 5, introduce gas during the standby which is in the condition that semiconductor fabrication machines and equipment have not processed to the semi-conductor substrate, and a processing chamber is raised to a desired pressure. Then, by repeating suspending supply of gas and performing vacuum suction to a desired pressure, performing it, and carrying out a cycle purge, the foreign matter in a processing chamber can always be discharged, and adhesion of a up to [the semi-conductor substrate of a foreign matter] can be prevented beforehand. Moreover, the processing repeatability by which can always maintain a processing ambient atmosphere equivalent to the time of processing of a semi-conductor substrate, and the semi-conductor substrate was stabilized by implementation of this cycle purge is acquired, and, similarly improvement in processing quality can be realized. Furthermore, since it can produce without dummy processing by performing this cycle purge, the cost reduction by the amount-used cutback of the improvement in a throughput by the cutback of time amount losses or particular gas becomes realizable.

[0019]

Moreover, it is characterized by there being semiconductor fabrication machines and equipment of this invention according to claim 6 with two or more kinds of mixed gas with which the gas passed from gas installation equipment contains nitrogen, the simple substance of inert gas, nitrogen, or inert gas in the above-mentioned configuration according to claim 5.

[0020]

[Embodiment of the Invention]

Below, the gestalt of operation of this invention is explained as a condition using concurrency plate plasma-CVD membrane formation equipment based on drawing.

[0021]

Semiconductor fabrication machines and equipment are divided into the load lock chamber 1, the common conveyance chamber 2 connected to this load lock chamber 1, and 1 thru/or two or more processing chambers 3 connected to this common conveyance chamber 2 in drawing 1 . And while the 1st gate 7 is established in the connection of the load lock chamber 1 and the common conveyance chamber 2, the 2nd gate 8 is established in the connection of the common conveyance chamber 2 and the processing chamber 3.

[0022]

Said load lock chamber 1 introduces this semi-conductor substrate 30 into a vacuum ambient atmosphere by carrying out taking-out close [of the semi-conductor substrate 30] between the exteriors, and the semi-conductor substrate storing section 16 is formed. Moreover, the common conveyance chamber 2 delivers the semi-conductor substrate 30 between the load lock chamber 1 and the processing chamber 3 (taking-out close), and the conveyance arm 17 etc. is formed. And the processing chamber 3 processes the semi-conductor substrate 30, and the up electrode 18 and the lower electrode 19 are formed.

[0023]

The pressure survey machines (an example of internal pressure assessment equipment) 4-6 are connected to each chambers 1-3, respectively. each pressure detection outputs 4A-6A from each pressure survey machines 4-6 -- difference -- it puts into a detector 10 -- having -- this difference -- in the detector 10, while pressure detection output 4A of the load lock chamber 1 is compared with pressure detection output 5A of the common conveyance chamber 2, it is constituted so that pressure detection output 5A of the common conveyance chamber 2 may be compared with pressure detection output 6A of the processing chamber 3. and difference -- the output from a detector 10 is inputted into the gate switchgear 9, and it constitutes so that both the gates 7 and 8 may be opened and closed to each **.

[0024]

The gas installation tubing 13-15 is connected to each chambers 1-3, respectively. The control-of-flow equipments 21-23 are attached in these gas installation tubing 13-15, respectively, with in it, the gas installation tubing 13-15 and the control-of-flow equipments 21-23 constitute an example of the gas installation equipment which can be introduced into the interior of each chambers 1-3, where control of flow of the gas is carried out. In addition, the exhaust air sections 1a-3a are formed in each chambers 1-3 (refer to drawing 4 .). Corresponding to said processing chamber 3, the adjustment machine 11 and RF generator 12 are formed, and these are used in case the plasma is generated.

[0025]

Although closed in the conventional equipment configuration at the times other than the time of conveyance, said 1st gate 7 is always made into the open condition with the gestalt of operation, once opening, in order to prevent the futility and foreign matter generating by closing motion. Moreover, since particular gas was used for the 2nd gate 8 within the processing chamber 3, it was made close except the time of conveyance of the semi-conductor substrate 30. Although the gas installation from said gas installation tubing 13-15 was inert gas installation at the time of conveyance, it was carried out by editing the step in a processing recipe.

[0026]

Moreover, by the approach of operation, manual actuation is performing the cycle purge by the inert gas at the time of equipment standby after processing. It becomes automatable by including in a system. The configuration (flow) shifts to cycle purge actuation after the completion judging of processing, and seems to repeat and perform a primitive operation cycle during processing, as shown in drawing 2 . In addition, with the gestalt of operation, nitrogen was used as gas.

[0027]

If the semi-conductor substrate 30 is introduced into the semi-conductor substrate storing section 16 in the load lock chamber 1, vacuum suction of the inside of the load lock chamber 1 will be carried out through exhaust air section 1a. the time (this pressure value is hereafter set to Ptrans.) of the pressure in this load lock chamber 1 and the pressure in the common conveyance chamber 2 reaching a desired pressure -- difference -- a signal is sent to the gate switchgear 9 from a detector 10, and as shown in drawing 1 , the 1st gate 7 opens. This 1st gate 7 presupposed that it has opened. This is for preventing fatigue, foreign matter generating depended for rubbing of parts by the 1st gate 7 opening

and closing repeatedly.
[0028]
And although the pressure in the processing chamber 3 shifts in the direction of a vacuum in order to discharge the residual gas in this processing chamber 3 when conveying the semi-conductor substrate 30 in the load lock chamber 1 in the processing chamber 3 through the conveyance arm 17 the time of the pressure in this processing chamber 3 reaching a certain controlled pressure Ptrans in the common conveyance chamber 2 -- difference -- a signal is sent to the gate switchgear 9 from a detector 10, and the 2nd gate 8 opens.
[0029]
Since an air current does not occur between the processing chamber 3 and the common conveyance chamber 2 when the processing chamber 3 and the common conveyance chamber 2 do not have the difference of a pressure at this time and the 2nd gate 8 opens, it can prevent that the foreign matter by winding up or blowing in adheres to up to the semi-conductor substrate 30. The foreign matter adhered in the condition that the difference of a pressure has generating of a foreign matter, i.e., the foreign matter antisticking effectiveness to the semi-conductor substrate 30 top, in the zero neighborhood, and there is a pressure differential with one large pressure in the condition that a foreign matter 0.16 micrometers or more exists in the processing chamber 3 and the common conveyance chamber 2 as shown in drawing 3 as a result of changing the pressure in each processing chamber 3.
[0030]
Although it considered as the condition that there is no pressure differential at the time of disconnection of the 1st gate 7 as mentioned above, the effectiveness of foreign matter antisticking is acquired for the same reason. However, residual gas may flow from the processing chamber 3 to the common conveyance chamber 2, and it is necessary to make the interior of the common conveyance chamber 2 corrode, to become cross contamination and a cause of a foreign matter to the semi-conductor substrate 30, and to avoid this in the condition that this pressure differential does not exist.

[0031]
That is, as shown in drawing 4 , when the pressure by the side of the processing chamber 3 is low compared with the common conveyance chamber 2, the wind W blown into the processing chamber 3 side from the common conveyance chamber 2 side by differential pressure (pressure differential) occurs. At this time, it will carry out and the foreign matter which exists in the processing chamber 3 takes adhesion X4 on winding up X1, drop X2, and the scattering X3 semi-conductor substrate 30 in the processing chamber 3. Moreover, it carries out, and a foreign matter may be generated and the residual gas in the processing chamber 3 and the oxygen contained in the wind W blown into the processing chamber 3 may take adhesion X4 to up to the reaction Y semi-conductor substrate 30 which has this foreign matter in the processing chamber 3.
[0032]
Conversely, when the pressure by the side of the common conveyance chamber 2 is low, as shown in drawing 5 , the wind W blown into the common conveyance chamber 2 side from the processing chamber 3 side occurs, and the foreign matter in the common conveyance chamber 2 winds up, and it will carry out and takes adhesion X4 on X1 and the drop X2 semi-conductor substrate 30 in the common conveyance chamber 2. There was few foreign matter adhesion at this time than the case where the pressure in said processing chamber 3 is low. This calls at the location of the semi-conductor substrate 30, and when the pressure in said processing chamber 3 was low, the semi-conductor substrate 30 was in the location where it is easy to be influenced of the wind W which the distance from the 2nd gate 8 in the processing chamber 3 generates by near and differential pressure, that is, foreign matter adhesion tends to take place.
[0033]
When the pressure in one common conveyance chamber 2 was low, the semi-conductor substrate 30 had the distance from the 2nd gate 8 in a long distance and the location which cannot be easily influenced of the wind W generated by differential pressure, i.e., the location where foreign matter adhesion cannot take place easily. At the time of conveyance initiation, these things show the semi-conductor substrate 30 as it is better to be in a location more distant than the 2nd gate 8 opened and

closed.
[0034]
At the time of closing motion of the 2nd gate 8, i.e., when carrying out taking-out close [of the semi-conductor substrate 30] from the common conveyance chamber 2 to the processing chamber 3 by the conveyance arm 17, where inert gas (example of gas) G is passed inside each chambers 1-3, the difference was prepared in the flow rate of inert gas G in each chamber 1-3 about the case where the pressure by the side of the processing chamber 3 is changed the common conveyance chamber 2 side. The flow rate of inert gas G passed to the load lock chamber 1 and the common conveyance chamber 2 here is made the same.
[0035]
Consequently, as shown in drawing 3 , when the common conveyance chamber 2 side and processing chamber 3 side was the same flow rate setting out, there were few increments in a foreign matter, and foreign matter adhesion of a up to [the semi-conductor substrate 30] has been prevented. Furthermore, when it sets up so that differential pressure may be set to 13Pa or less, there is the prevention effectiveness of foreign matter adhesion more. In this case, as shown in drawing 6 , even if it is always discharged out of the system through the exhaust air sections 1a-3a and a foreign matter X tends to invade into the semi-conductor substrate 30 side, since there is flow of inert gas G in the direction of the outside of a substrate from the inside of the substrate side of the semi-conductor substrate 30, the foreign matter X in each chamber 1-3 cannot invade, but can prevent adhesion of a foreign matter X. In addition, when distinguished between a flow rate, since a laminar flow collapsed, the turbulence of an air current arose, and the phenomenon with many foreign matter adhesion happened compared with the case where it is the same flow rate.
[0036]
Moreover, as effectiveness of passing inert gas G to each chambers 1-3, it is that reduction of moisture or the high impurity concentration by external minute leak and a high grade ambient atmosphere are realizable. Since it is discharged out of dilution or a system also about residual reactivity gas, the foreign matter generation by the reaction with the oxygen which invaded by external minute leak can be prevented.
[0037]
Drawing 7 is a comparison explanatory view with the case where there are not a case where a sink and the cycle purge which repeats vacuum suction and performs it after that are introduced, and a cycle purge, about the time amount gas of a request with the gas installation equipment installed in the processing chamber 3 at the period (the so-called standby condition) when semiconductor fabrication machines and equipment have not processed to the semi-conductor substrate 30.
[0038]
When there was no cycle purge, several sheets of the beginning had many foreign matters, and thickness fluctuation applied the cycle purge to the intense process. It turns out after cycle purge installation that the stable processing which decreases substantially and does not have initial fluctuation about thickness, either is possible for a foreign matter. In case processing was begun from equipment standby, dummy processing is added by precedence and it enabled it to produce by the stable zone conventionally. Since it can produce without dummy processing by performing this cycle purge, it becomes realizable [the cost reduction by the amount-used cutback of the improvement in a throughput by the cutback of time amount losses, or particular gas].
[0039]
By combining an item with the above foreign matter antisticking effectiveness, i.e., the gate closing motion in those without a pressure differential, installation of the inert gas at the time of conveyance, and the cycle purge at the time of equipment standby, there is no foreign matter adhesion by conveyance, and a semi-conductor substrate can be processed and manufactured in the stable quality.

[0040]
Although the simple substance of inert gas G is adopted with the above-mentioned gestalt of operation as gas passed from gas installation equipment, this may be two or more kinds of mixed gas containing the simple substance, nitrogen, or inert gas of nitrogen etc.
[0041]

Although inert gas (gas) G is passed to both the common conveyance chamber 2 and the processing chamber 3 with the above-mentioned gestalt of operation, this may be a method which passes inert gas (gas) G to one of the common conveyance chamber 2 and the processing chambers 3.
[0042]
[Effect of the Invention]
According to above-mentioned this invention, foreign matter adhesion can be reduced at the time of conveyance of the semi-conductor substrate within a semiconductor device, or processing of the semi-conductor substrate within a processing chamber, and it makes it possible to suppress poor processing and the increment in a foreign matter generated suddenly. Moreover, processing stability can also improve, and a quality semi-conductor substrate can be processed and manufactured.
[Brief Description of the Drawings]
[Drawing 1] An example of the gestalt of operation of this invention is shown and it is the basic block diagram of semiconductor fabrication machines and equipment.
[Drawing 2] The flow explanatory view of the cycle automation in these semiconductor fabrication machines and equipment
[Drawing 3] The related explanatory view of a pressure differential and the number of the increments in a foreign matter in these semiconductor fabrication machines and equipment
[Drawing 4] An explanatory view when the pressure by the side of the processing chamber in these semiconductor fabrication machines and equipment is low
[Drawing 5] An explanatory view when the pressure by the side of the common conveyance chamber in these semiconductor fabrication machines and equipment is low
[Drawing 6] The explanatory view at the time of passing gas in each chamber in these semiconductor fabrication machines and equipment
[Drawing 7] The explanatory view of the typical weighted-solidity improvement by the cycle purge in these semiconductor fabrication machines and equipment
[Description of Notations]
1 Load Lock Chamber
2 Common Conveyance Chamber
3 Processing Chamber
4 Pressure Survey Machine (Pressure Assessment Equipment)
5 Pressure Survey Machine (Pressure Assessment Equipment)
6 Pressure Survey Machine (Pressure Assessment Equipment)
7 1st Gate
8 2nd Gate
9 Gate Switchgear
10 Difference -- Detector
11 Adjustment Machine
12 RF Generator
13 Gas Installation Tubing
14 Gas Installation Tubing
15 Gas Installation Tubing
16 Semi-conductor Substrate Storing Section
17 Conveyance Arm
18 Up Electrode
19 Lower Electrode
21 Control-of-Flow Equipment
22 Control-of-Flow Equipment
23 Control-of-Flow Equipment
30 Semi-conductor Substrate
W Wind
X Foreign matter
X1 Winding up
X2 Drop
X3 Scattering

X4 Adhesion
Y Reaction
G Inert gas (gas)

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DESCRIPTION OF DRAWINGS

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[Drawing 6] The explanatory view at the time of passing gas in each chamber in these semiconductor fabrication machines and equipment
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[Description of Notations]
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5 Pressure Survey Machine (Pressure Assessment Equipment)
6 Pressure Survey Machine (Pressure Assessment Equipment)
7 1st Gate
8 2nd Gate
9 Gate Switchgear
10 Difference -- Detector
11 Adjustment Machine
12 RF Generator
13 Gas Installation Tubing
14 Gas Installation Tubing
15 Gas Installation Tubing
16 Semi-conductor Substrate Storing Section
17 Conveyance Arm
18 Up Electrode
19 Lower Electrode
21 Control-of-Flow Equipment
22 Control-of-Flow Equipment
23 Control-of-Flow Equipment
30 Semi-conductor Substrate
W Wind
X Foreign matter
X1 Winding up

X2 Drop
X3 Scattering
X4 Adhesion
Y Reaction
G Inert gas (gas)

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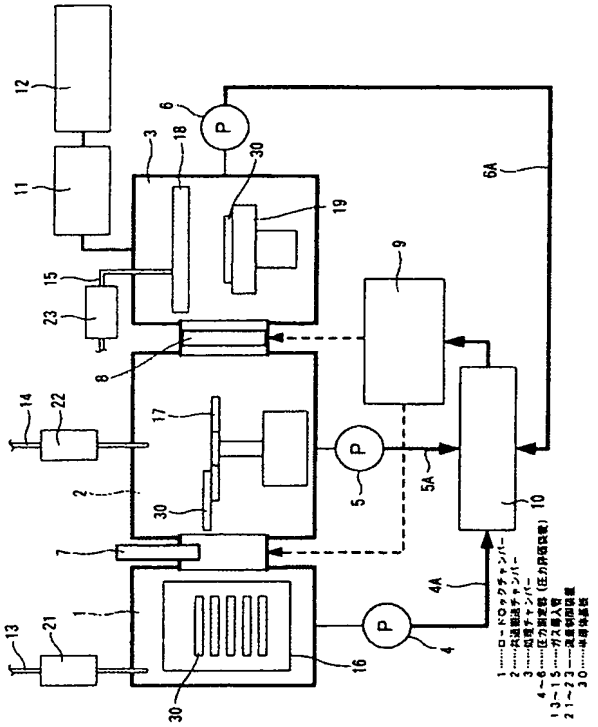
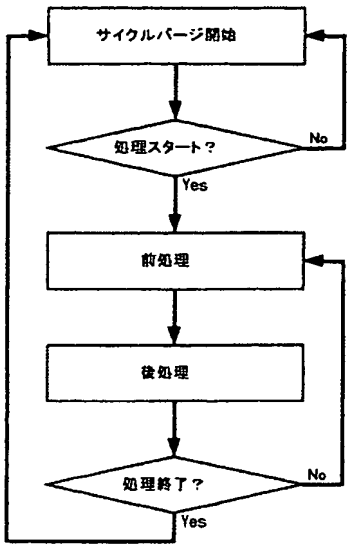
DRAWINGS

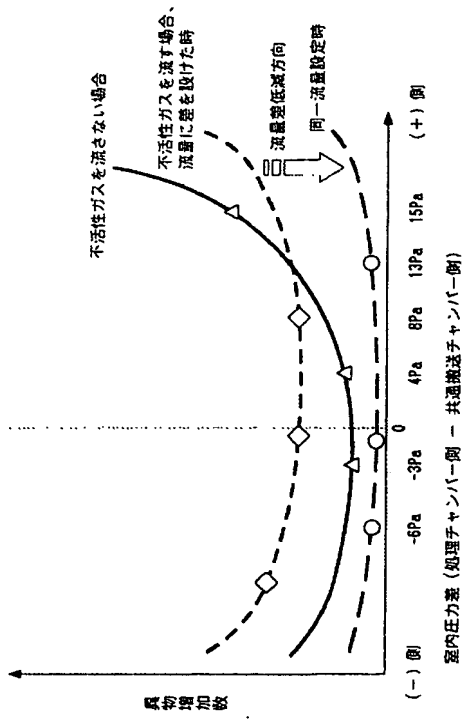
[Drawing 1]



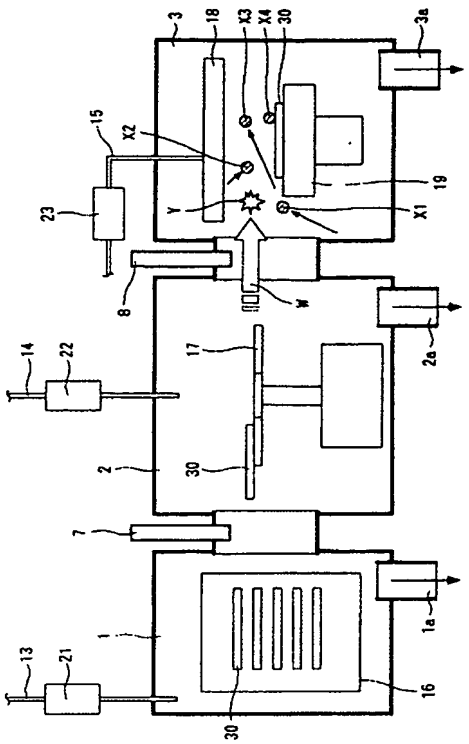
[Drawing 2]



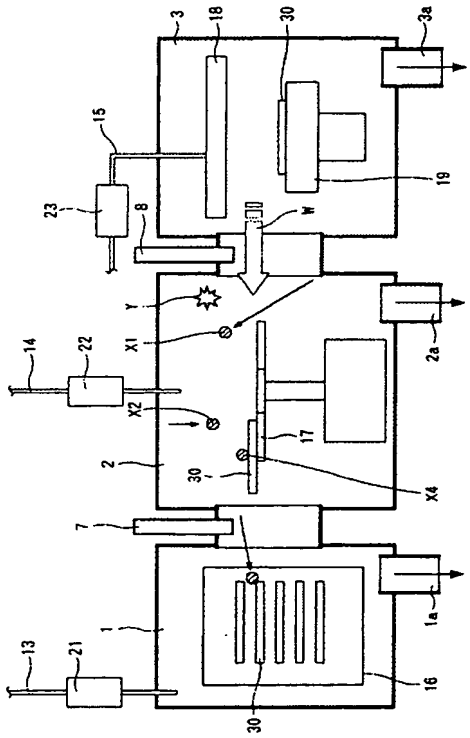
[Drawing 3]



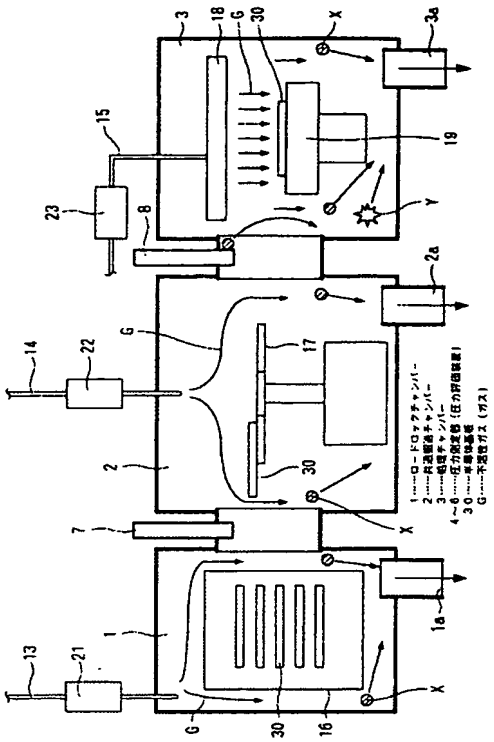
[Drawing 4]



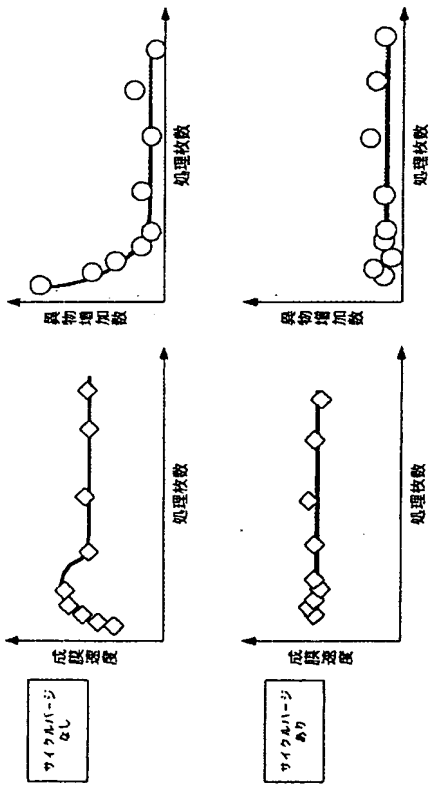
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]